

## CLAIMS:

1. A method of manufacturing an electronic device comprising a micro-electromechanical systems (MEMS) element, which MEMS element comprises a first and a second electrode, which second electrode is movable towards and from the first electrode, which method comprises the steps of:
  - 5 - providing an etch stop layer (18) of electrically insulating material at a first side of a substrate (14);
  - providing a base layer (10) of an electrically conductive material at the first side of the substrate (14), in which base layer the first electrode is defined;
  - providing a sacrificial layer (16), which at least covers the first electrode in the
  - 10 base layer (10);
  - providing a mechanical layer (12) of an electrically conductive material on top of the sacrificial layer (16), said mechanical layer (12) being mechanically connected to the substrate (10);
  - providing a mask (20) on top of the mechanical layer (12) which includes at
  - 15 least one window (21) to the sacrificial layer (16), and
  - removing selective areas of said sacrificial layer (16) by means of dry chemical etching, such that the second electrode is made movable towards and from the first electrode,
  - wherein said dry chemical etching is performed using a fluorine-containing plasma, and the
  - 20 etch stop layer (18) comprises a substantially non-conducting, fluorine chemistry inert material.
2. A method as claimed in Claim 1, wherein the sacrificial layer (16) comprises anorganic material.
- 25 3. A method as claimed in Claim 2, wherein the device further comprises a thin-film capacitor (50) having a first and a second electrode (51,52) and an intermediate dielectric, which first electrode (51) is defined in the base layer (10) and which dielectric is

defined in the sacrificial layer (16), this capacitor part of the sacrificial layer (16) not being removed.

4. A method as claimed in Claim 1, wherein the etch stop layer (18) is provided  
5 at the first side of the substrate (14) before provision of the base layer (10).
5. A method according to claim 1, wherein said fluorine-containing plasma is a  $CF_y$  plasma.
- 10 6. A method as claimed in Claim 1, further comprising the steps of:
- providing an intermediate layer (11) of an electrically conductive material on the sacrificial layer (16), in which intermediate layer (11) the second electrode is defined; and
  - providing a second sacrificial layer (17), which covers the second electrode at least partially, said second sacrificial layer (17) being removed in the same step as the first  
15 sacrificial layer (16).
7. A method as claimed in Claim 6, wherein the base layer (10) is provided with a contact pad, at least one window in the first and the second sacrificial layer (16, 17) leaving the contact pad exposed until filling of the window during provision of the mechanical layer  
20 (12) and wherein the window in the first sacrificial layer (16) is provided after deposition of the second sacrificial layer (17).
8. An electronic device comprising a micro-electromechanical systems (MEMS) element at a first side of a substrate (14), which MEMS element comprises a first (10) and a  
25 second electrode (12) that is movable towards and from the first electrode (10) between a closed and an opened position, and that is separated from the first electrode (10) by an air gap in its opened position,  
characterized in that the device is provided with an etch stop layer (18) between the first electrode (10) and the substrate (14), which etch stop layer (18) comprises a substantially  
30 non-conducting, fluorine chemistry inert material.
9. A device as claimed in claim 8 or a method as claimed in Claim 1, wherein said etch stop layer (18) comprises a GroupIV<sub>n</sub>-oxide.

10. A device or method as claimed in Claim 9, wherein said etch stop layer (18) comprises  $\text{HfO}_2$ ,  $\text{ZrO}_2$ ,  $\text{Al}_2\text{O}_3$  or  $\text{TiO}_2$ .
11. A device as claimed in Claim 8 or a method as claimed in Claim 1,
- 5 characterized in that the substrate (14) is a silicon substrate.